

22 December 1966

COLOR FILM/PRINT DRYER -- STAFF STUDY  
#10047

2. FACTS BEARING ON THE PROBLEM

a. The Armed Services have increased the use of color in tactical applications. Camouflage Detection Film (color material) is being used in Vietnam. The services have purchased equipment to process this original material. Also, they recently spent \$4,000,000 for supplies of acquisition type color films, reproduction color materials, and color processing chemicals.

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b. NPIC prepares color viewgraphs showing flight path of every mission it handles. Normally more than [REDACTED] viewgraphs each of several tracks are prepared for each mission.

c. The two new automatic color processing machines in NPIC can process color sheet film on paper at the rate of 200 8" x 10" sheets or the equivalent each hour. This equipment does not include drying systems.

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d. Investigation of commercially available equipment has shown that there are no dryers available that can handle the drying capacity produced by these two machines.

e. Any increase in the use of color sheet materials will require advanced drying systems to match the high production rate of the automatic processing equipment.

3. DISCUSSION

a. Current Procedure -

(1) Cut sheet color films are presently dried in a drying chamber or cabinet. The films are usually placed in film hangers in the drying cabinet and hot air is circulated around the film. These cabinets can handle about 60 sheets per hour. This method is time consuming and does not dry the film in a quality fashion, that is, the film is not dried so that there is no evidence of watermarks, abrasions, scratches, image distortion, peeling, curl, fading, color shifts, mottling, etc.

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(2) Glossy color prints are dried in much the same way as glossy black and white prints. During the drying process, the emulsion is kept in contact with a highly polished chromed surface, usually a drum. The gelatin of the emulsion forms to the surface of the chromed plate or drum, leaving the print with a high gloss finish. The drying process for glossing color prints, using commercial black and white dryers, is very critical. The temperature and speed of the dryer have to be kept within close tolerances. The output is limited because the dryers must use a slower speed for color print materials.

(3) There are no commercial print dryers that can rapidly dry color prints matte, in a quality manner. The most accepted method uses hot air drying racks. The prints are placed face up on a saran mesh shelf in the rack, where hot air is circulated around them. This process takes at least 20 minutes and leaves curled and wavy prints, which then have to be flattened in a dry mounting process. During the flattening process there is danger of cracking the emulsion.

(4) Another method of drying prints matte is allowing them to air dry without applying heat. This method usually prevents severe curling but requires several hours of drying time.

b. Origin of Concept - The need to study advanced color film and paper drying techniques is becoming more acute. As the services are using more and more color photography for tactical purposes, it is feasible that NPIC could suddenly be tasked with the requirement for selectively reproducing cut sheet prints of this photography. It is important that NPIC be prepared to handle cut sheet color materials. A study in drying technique may result in a method and probable drying equipment design parameters which will satisfy an increased requirement for the reproduction of color sheet materials.

c. Selection of Contractor - NPIC has solicited nine industrial corporations to bid on a Color Film/Print Dryer Study. Five have submitted proposals. Of the five, the proposal from [REDACTED]

25X1A the most thorough understanding of the requirements as outlined in the [REDACTED] illustrates development objectives.

25X1A d. Proposed Program [REDACTED] proposes an eight-month program to investigate advanced techniques for drying photographic color prints and color sheet films. The most promising drying techniques will be investigated, and upon NPIC approval, the most feasible approaches will be breadboarded. The breadboards will demonstrate the recommended techniques and result in design parameters for an advanced color film and paper dryer or dryers. No prototype hardware will be developed under this program.

e. Program Phasing - The contractor will submit monthly reports on expenditures, work performed, and results obtained. After five months, the contractor will present recommended drying techniques, and upon concurrence of NPIC personnel, breadboard hardware will be constructed to demonstrate the most promising techniques. From these breadboard demonstrations the contractor will formulate, in the final report, design parameters for an optimized color sheet material dryer.

f. Coordination - This project has been coordinated with DDS&T/ORD. Members of the Community have received advance narrative description of the project through the Committee on Photographic Exploitation (COPE).

g. Alternatives - An alternative to the study program would be to solicit bids for hardware development. This method would probably result in acquiring equipment that may not use the most efficient technique in color material drying, and may not satisfy future production requirements of NPIC.

#### 4. CONCLUSIONS

The new color processing machines in NPIC have increased the capability to produce color sheet prints or transparencies. Rapid dryers using advanced techniques are needed to accommodate the production from two Color Automat Processors so the NPIC can meet any future requirements of increased color cut sheet reproduction.

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[REDACTED] past experience in the area of film technology and photo-processing techniques well qualifies them to perform the study.

#### 5. RECOMMENDATIONS

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It is recommended that approval be granted to contract with [REDACTED] for a Color Film/Print Dryer Study.

#### 6. REFERENCES AND ATTACHMENTS

TAB A Catalog Form  
TAB B Development Objectives (2)  
TAB C Program Phasing

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Attachment: [REDACTED]